DEPARTMENT OF _____STATISTICS_____

LAHORE COLLEGE FOR WOMEN UNIVERSITY, LAHORE

SELF-ASSESSMENT REPORT

2018

BS/MS

Submitted to

Quality Enhancement Cell,

Lahore College for Women University, Lahore

Dated: _____

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T A B L E O F C O N T E N T S

Department of Statistics

Statistics was introduced as a subject in 1962, with the first class comprising 3 students and bachelor's program commenced in 1964 with only 11 students. The number of students opting to study statistics at both intermediate and bachelor level has increased significantly over the years on account of its wide application in various fields.

The subject of statistics is a mathematical science that is not only multidisciplinary, it is also multi-dimensional as it is widely put to use in almost all physical and applied sciences. Therefore, the subject has become natural choice of students as it provides them with the exposure essentially needed in different fields of study, thus adequately preparing them for job market. The study of subject is career oriented and crucial to planning of social development. The courses offered at Statistics department are aimed at producing highly educated researchers motivated to contribute in these economic and social development of Pakistan. Aimed at developing advanced competencies in research, Statistics Department of LCWU, launched M.S program in 2013. It was designed to produce high quality statisticians. Recognizing the importance of this subject regarding its application in research work in almost all disciplines, the courses have been designed to encourage students to develop a broad range of skills in different areas.

Criterion 1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

Department Mission Statement

The mission of the Statistics Department is to help students develop their vision and interest, expand their understanding of the role of statistics, demonstrate how sound statistical methodology strengthens scientific conclusions, cultivate the ability to understand and communicate the results from empirical research in an ethical manner while applying methods of modern statistical science.

BS Program Mission

The department stands to provide advanced program with interest activated syllabi for students to develop probabilistic theories and data analysis techniques with balanced program of teaching so as to inculcate in them research skills and to attain capability to serve at both national and international levels.

MS Program Mission

The program aims to strengthen the statistical and mathematical skills beneficial for productive research and professional career and also enable them to pursue advanced studies.

CRITERION 1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

Standard 1-1: The program must have documented measurable objectives that support college and institution mission statements**.**

Name of Programs	Duration	No. of Modules	Total Credit Hrs
B.S. Statistics	4 years degree program	8 semesters	131
M.S. Statistics	2 Years	4 Semesters	36

BS Program Objectives

The objectives are consistent with the outlined syllabus.

- Concept Building
- Development of Logical and Analytical Skills
- Research Based Learning Experience
- Solid Practice and Application of Statistics

Objective 1

1. To provide students with strong degree program with advanced and balanced syllabi.
2. To provide students with excellent coaching, advising and learning environment**.**

Objective 2

1. Students should have understanding of broad set of fields like probability and inferential theories, surveys and data analysis techniques, designing experiments and modeling etc.
2. Promoting faculty and student expertise in technology and its use in teaching and learning e.g web, multimedia and computer systems.
3. Use of statistical software.
4. Enhance the confidence and desire of students for continuous independent learning.
5. Encourage to work in groups.

Objective 3

1. To enable the students to produce research literature at national and international levels.
2. To hold seminars, lectures and conferences.
3. To pursue higher studies.

Objective 4

1. Ability to apply theory to solve real world problems.
2. To prepare students for careers in education, clinical trials, statistical bureau, industry, business management and planning and development fields etc.

MS Program Objectives

The objectives are consistent with the outlined syllabus.

- Strengthening of Logical and Analytical Skills
- Research Based Learning Experience
- Contemporary syllabus synchronized with higher studies and job market.

Objective 1

1. To reinforce the concepts and application of statistical methodology to be applied in natural and social sciences.
2. Use of statistical soft wares.

Objective 2

1. To Facilitate them with research based environment to contribute through publications in both statistics and subject-matter journals.
2. To equip students with the sound knowledge of theoretical and applied development in the field.

Objective 3

1. To deliver a quality program aligned with international standards that prepares the student to pursue advanced studies.
2. To prepare students for careers in education, banking, health sector, industry, business management, planning and development fields etc.

Strategies:

Main elements of the strategic plan to achieve program mission and objectives

1. Curriculum design: Core and Elective subjects. A wide variety of elective subjects are offered to append diversity in the program.
2. Application of theoretical knowledge by using the statistical soft wares.
3. Compulsory Research work or Internships to give experience to students.
4. Regular revision of curricula to keep them aligned with the national and international developments.
5. Training students to be useful members of society by executing the community service projects.
6. Faculty development courses

Table 4.1 shows the ways of program's objective assessment and the strategies that are used to improve the program

Table 4.1.1:BS Programs Objectives Assessment

OBJECTIVES	HOW MEASURED	WHEN MEASURED (FREQUENCY)	IMPROVEMENT IDENTIFIED	IMPROVEMENT MADE (CORRECTIVE & PREVENTIVE ACTION)
(1)	(2)	(3)	(4)	(5)
1- Concept building	1) Regular assessment of student knowledge and ability to exhibit the skill by the teacher:		1) Regularity of attendance required 2) Course / curriculum revision to enhance outcomes and make it more work based 3) Improving writing skills especially in English 4) Enhancing teaching skills 5) Students counselling and guidance 6) Enhancing confidence level &communication skills 7) Guidance to student 8) Incorporation of IT at elementary level	1) Attendance rules applied more strictly. 2) Teachers training and development courses are arranged by the University 3) Course / curriculum revised 4) Presentations are taken per semester to improve their skills.
	i) Class tests are taken	1test before mid term test , 1 test before final term.		
	ii) Class exercises relating to problem	As per course requirement		
	iii) Presentation & assignment of relevant topic	Once in a semester		
	iv) Class Discussion	As per course requirements		
	v) Quizzes	As per course requirement		
	2) Written examination	Twice during each semester		
	3) Practical assignment (case studies) in each modules	As per course requirement		
	4) Research/ Internship report in 7th semester	Once during program		
2- Development of logical and Analytical skills	Class assignments Practice questions Through presentations	Periodically during each semester	Performance Confidence Faculty feedback	More credible to handle statistical problems
3- Research based learning experience	Through class projects Research thesis/internship report Field survey	As per course requirements Once during programmes	Through presentations Through viva/project evaluation	Seminars and workshops Eligibility for higher studies
4- Solid practice and application of statistics	Skill in computer usage Skill in statistical software	As per course requirements As per requirements Once during programme	Short term and long-term assessments Through improvement in data handling skills	Alumni survey Better opportunities for induction in job market

Table 4.1.2: MS Programs Objectives Assessment

OBJECTIVES	HOW MEASURED	WHEN MEASURED (FREQUENCY)	IMPROVEMENT IDENTIFIED	IMPROVEMENT MADE (CORRECTIVE & PREVENTIVE ACTION)
(1)	(2)	(3)	(4)	(5)
1- Strengthening of Logical and Analytical Skills	1) Regular assessment of student knowledge and ability to exhibit the skill by the teacher:		1) Course / curriculum revision to enhance outcomes and make it more work based 2) Enhancing teaching skills 3) Regularity of attendance required 4) Students counselling and guidance i. Enhancing confidence level &communication skills ii. Guidance to student iii. Performance iv. Faculty feedback v. Incorporation of IT at elementary level	1) Attendance rules applied more strictly. 2) Teachers training and development courses are arranged by the University 3) Course / curriculum revised 4) Presentations are taken per semester to improve their skills. 5) More credible to handle statistical problems
	i) Class tests are taken	1test before mid term test , 1 test before final term.		
	ii) Class exercises relating to problem	As per course requirement		
	iii) Presentation & assignment of relevant topic	Once in a semester		
	iv) Class Discussion	As per course requirements		
	v) Quizzes	As per course requirement		
	2) Written examination	Twice during each semester		
	3) Practice questions	As per course requirement		
2-Research based learning experience	Through class presentations Research thesis Field survey Skill in computer usage Skill in statistical software	As per course requirements Once during programmes As per course requirements	Through presentations Through viva/project evaluation	Seminars and workshops Eligibility for higher studies
3-Contemporary syllabus synchronized with higher studies and job market.	Opportunities to work in different fields and departments Enhancement of Skills in data handling Higher studies		Short term and long-term assessments Through improvement in data handling skills	Alumni survey Better opportunities for induction in job market Better performance in higher studies

Standard-1.2: The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the program objectives and that graduating students are capable of performing these outcomes**.**

BS Program Outcomes

1. Students shall have the necessary competence to find solution to complex statistical problems.
2. Student shall have tacit understanding of statistics as a subject so that they become professionals and have the capability to adapt to any challenges that may be offered within their careers.
3. Students shall articulate a conducive environment whereby research culture is developed in various statistical disciplines.
4. Students shall be so equipped in advanced techniques and standards to qualify them to pursue higher studies in reputed foreign universities.
5. Students shall have the communication skills as to be able to apply for integrated studies as well as to benefit them in their professions.
6. Students shall be able to achieve educational standards vis-à-vis appropriate skills as are required in the job market.
7. Students shall have the ability to contribute effectively in collaborative environment as productive team members for the respective organizations they serve.

The following table shows the relationship between BS Program Objectives and Program outcomes.

These objectives are assessed on regular basis:

Table 4.2.1 : BS Program Outcomes versus objectives

Program Objectives	**Program Outcomes**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
1.1	◊	◊	-	◊	-	◊	-
1.2	◊	◊	◊	-	◊	◊	◊
2.1	◊	◊	-	-	-	◊	-
2.2	◊	-	-	-	◊	◊	-
2.3	◊	-	◊	◊	-	◊	-
2.4	-	◊	◊	-	◊	◊	◊
2.5	◊	-	◊	-	◊	-	◊
3.1	-	-	◊	◊	-	-	-
3.2	◊	-	◊	◊	◊	-	-
3.3	-	◊	◊	◊	◊	-	-
4.1	◊	◊	◊	-	-	◊	◊
4.2	-	◊	-	-	◊	◊	◊

MS Program Outcomes:

1. Students shall have the expertise to handle and analyze the complex data problems.
2. Students shall be equipped with advanced techniques and standards to qualify them to pursue higher studies in reputed foreign universities.
3. Students shall be able to stream line themselves with the research culture and development in various statistical disciplines.
4. Students shall be able to achieve educational standards vis-à-vis appropriate skills as are required in the job market.

Table 4.2.2 : MS Program Outcomes versus objectives

Program objectives	Program outcomes			
	1	**2**	**3**	**4**
1.1	◊	◊	-	◊
1.2	◊	-	◊	◊
2.1	-	◊	◊	-
2.2	◊	◊	◊	-
3.1	-	◊	◊	◊
3.2	◊	-	◊	◊

Standard 1.3: The results of program's assessment and the extent to which they are used to improve the program must be documented.

Actions taken on the basis of assessment:

1) Syllabi revision
2) Faculty development (Seminars and Lectures)
3) Infrastructure Development (Computer Lab)

Future Plans:

1) Four faculty member has completed PhD requirement and One member has submitted her thesis for evaluation in 2018. Six faculty members are pursuing PhD degree.
2) Holding of Lectures and Seminars on regular basis to enhance the knowledge of faculty and students.
3) To start Ph.D program in coming years
4) To arrange national/international Conference
5) To establish consultancy center
6) To organize workshops and academic events.

Strengths of Department:

1) Teamwork
2) Work Environment
3) Research Collaboration

Weaknesses of Department:

1) More Separate room for Staff members
2) No research room available
3) Computer Operator for Lab
4) Departmental Library
5) A Clerk is required to perform official work (maintenance of Records and paper work)
6) Labs Development (more capacity and computers are required)
7) P.A for Head of Department

Standard 1.4: The department must assess its overall performance periodically using quantifiable measures.

1.4.1 Performance Measures:

T**able 3: No. of Students Enrolled**

Program	Session	No. of Students
BS	2012-16	**63**
	2013-17	80
	2014-18	45

Program	Session	No. of Students
MS	2014-2016	7
	2015-2017	7
	2016-2018	7

Table 4: Student-Faculty Ratio

Year	No. of Students	No. of Faculty Members	Student-Faculty ratio
2016-17 Fall	2334	18	1:130
2016-17Spring	1399	16	1:88
2017-18 Fall	1865	19	1:98
2017-18 Spring	1500	18	1:83

Table 5: No. of Students Passed Out

Program	Passing out Year	No. of Students
BS	2016	57
	2017	60
	2018	43

Program	Passing out Year	No. of Students
MS	2016	4
	2017	7
	2018	5

Table 6: Percentage of Honor Students & Attrition Rate

BS Year	%age of Honor Students **Criteria:** CGPA 3.75 and above	Attrition Rate (Admitted –pass out) *100 / Admitted
2016	1	9.5
2017	1	25
2018		4

MS Year	%age of Honor Students **Criteria:** CGPA 3.75 and above	Attrition Rate (Admitted –pass out) *100 / Admitted
2016	1	42
2017	-	0
2018	-	28

Table 7: Faculty Training, Seminars and workshops (Appendix A)

Year	No. Of Trainings, Seminars and workshops
2015	16
2016	5
2017	5
2018	16

Papers Published at National & International Level

Table 8: Number of Publications (Appendix B)

Year	Papers published
2015	4
2016	7
2017	3
2018	8

Books in Library

- Total number of books in library are 2000.

Research Areas

The Faculty is involved in research in the following areas:

- Applied Statistics
- Mathematical Statistics

Departmental Achievements (others)

Research Poster Presentations

1. Afshan, F., and Kamal, A. (2017). Improved Predictive Exponential Type Estimators of Population Mean. Presented at 2nd COMSATS STATISTICS POSTER COMPETITION held on May, 11, 2017 at COMSATS Lahore. **Stood 3rd in a competition.**

Honors and Awards

- Dr. Asifa Kamal was awarded Post-Doctoral Fellowship at University of Southampton, UK by Punjab Higher Education Commission of Pakistan.
- Dr. Sadia Khalil got "Young Researcher Award" from university of North Carolina, Greensboro (UNCG), North Carolina USA to attend an international conference on Advances in interdisciplinary statistics and combinatorics (AISC 2018) held in October 2018.

CRITERION 2: CURRICULUM DESIGN AND ORGANIZATION

➡ **Degree Title**

BS Statistics

➡ **Definition of Credit Unit**

One semester credit hour represents one class hour (60 minutes) or two laboratory hours per week. An academic semester represents 16 weeks of classes exclusive of final exam.

➡ **Degree plan.**

Tables 2.1 & 2.2 show curriculum breakup of BS degree in terms of major requirements.

Table 2.1: Curriculum course requirements

Year	Courses	Title	Credit Hours	Lab. Hr	Total Credit Hr	Pre Requisites
I	Maj/stat-101	Introductory Statistics	3	1	4	
	CC/Isl-101	Islamic Education	2	-	2	____
	CC/Eng-101	Language in use	3		3	
	CC/Eng-102	Academic Reading & Writing	3	-	3	____
	CC/PS-101	Pakistan Studies	2	-	2	____
	CC/CS-102	Introduction to computers	3	-	3	
	Maj/Stat-102	Introduction to Probability dist	3	1	4	Maj/Stat-101
II	CC/Eng-101	Communication Skills	3	-	3	____
	GC/MC-201	Introduction to Communicate & Mass Media	3	-	3	____
	Maj/Stat-201	Basic Statistical Inference	3	1	4	Maj/Stat-102

	Maj/Stat-202	Computer Programming	3	0	3	____
	Maj/Stat-203	Introduction to Regression Analysis & Experimental design	3	1	4	Maj/Stat-(101-201)
	Maj/Stat-204	Statistical Package	3	0	3	Maj/Stat(102-203)
	Maj/Stat-205	Applied Statistics	3	1	4	Maj/Stat-101
	CC/Eng-202	Advanced Academic Reading & Writing	3	0	3	Maj/Stat-101
III	Maj/Stat-301	Probability & Probability distribution I	3	0	3	Maj/Stat-201
	Maj/Stat-302	Design & analysis of Experiment I	3	1	4	Maj/Stat-202
	Maj/Stat-303	Sampling Techniques I	3	1	4	Maj/Stat201
	Maj/Stat-304	Regression Analysis	3	1	4	____
	Maj/Stat-305	Research Mythology	2	0	2	Maj/Stat-303
	Maj/Stat-306	Probability& Probability distribution II	3	0	3	Maj/Stat-301
	Maj/Stat-307	Design & analysis of Experiment II	3	1	4	Maj/Stat-302
	Maj/Stat-308	Sampling Techniques II	3	1	4	Maj/Stat-303
	Maj/Stat-309	Econometrics	3	1	4	____
	EC/NM-301	Numerical methods	3	0	3	____
IV	Maj/Stat-401	Statistical Inference-I	3	0	3	Maj/Stat-301
	Maj/Stat-402	Project/ Internship	6/3	-	6/3	____
	EC/Stat-401	2 Electives if Thesis/ 3 Electives if Internship	3	-	3	___
	EC/Stat-402		3	-	3	____
	EC/Stat-406	3rd Elective if Internship	3	-	3	____
	Maj/Stat-403	Statistical Inference-II	3	0	3	Maj/Stat-410
	Maj/Stat-404	Multivariate Analysis	3	0	3	Maj/Stat-306
	EC/Stat-403	3 Electives	3	-	3	____
	EC/Stat-404		3	-	3	____
	EC/Stat-405		3	-	3	____

Minor courses offered in BS Statistics

	Course Code	Course Title	Credit Hour
I	Min/Math-101	Elementary differential and Integral Calculus	03(3+0)
	Min/Eco-101 or Min/Psy-101 or Min/Geo-101 or Min/Soc.W-101	Microeconomics Elements of Psychology-I Physical Geography-I Introduction & Basic Methods of Social Work	03(3+0)
	Min/Math-102	Complex numbers and Analytical Geometry	03(3+0)
	Min/Eco-102 or Min/Psy-102 or Min/Geo-102 or Min/S.W-102	Macroeconomics Elements of Psychology-II Physical Geography-II Society and Social Change	03(3+0)
II	Min/Math-201	Three Dimensional Analytical Geometry and Differential Equations	03(3+0)
	Min/Math-202	Infinite Series and linear Algebra	03(3+0)

Curriculum Breakup

Curriculum Breakup	Credit Hours
Statistics Core Courses	
Introductory Statistics	4
Introductory to Probability dist	4
Basic Statistical Inference	4
Computer Programming	3
Introduction to Regression Analysis & Experimental Design	4
Statistical Package	3
Applied Statistics	4
Probability & probability dist-I	3
Design & Analysis of Experiments-I	4
Sampling Techniques-I	4
Regression Analysis	4
Research Methodology	2
Probability & probability dist-II	3
Design & Analysis of Experiments-II	4
Sampling Techniques-II	4
Econometrics	4
Statistical Inference- I	3
Project/Internship	6/3
Statistical Inference- II	3
Multivariate Analysis	3
Language in use	3
Islamic Education	2
Academic reading &Writing	3
Pakistan Studies	2
Introduction to Computer's	3
Communication Skills	3
Introduction to communication and Mass Media	3
Advanced Academic Reading & Writing	3
Elective Courses	18/21(with Internship)
Total Credit Hours	113

Table 4.3: Curriculum course requirements

Semester	Course Number	Category (Credit Hours)				
		Math and Basic Science		Core Courses	Humanities and Social Sciences	Technical Electives
		Math	Basic Science			
I+II	CC/Eng-101, CC/Isl-101, Maj/Stat-101, Min/Math-101, Min/Eco-101 Or Min/Psy-101 Or Min/Geo-101 Or Min/Soc.W-101, CC/Eng-102, CC/PS-101, CC/CS-102, Maj/Stat-102, Min/Math-102, Min/Eco-102 Or Min/Psy-102 Or Min/Geo-102 Or Min/S.W-102	12		8	10	3
III+IV	CC/Eng-201, GC/ MC-201, Maj/Stat-201, Maj/Stat-202, Min/Math-201, CC/Eng-202, Maj/Stat-203, Maj/Stat-204, Maj/Stat-205 Min/Math-202,	6		18	9	
V+VI	Maj/Stat-301, Maj/Stat-302, Maj/Stat-303, Maj/Stat-304, Maj/Stat-305, Maj/Stat-306, Maj/Stat-307, Maj/Stat-308,			35		

	Maj/Stat-309, EC/NM-301,					
VII+VIII	Maj/Stat-401, Maj/Stat-402, EC/Stat-401 EC/Stat-402, Maj/Stat-403, Maj/Stat-404, EC/Stat-403 EC/Stat-404 EC/Stat-405			30		
Total		**18**		**91**	**19**	**3**
Minimum Requirements						

Table 4.4 Courses Vs. Program Outcomes

Courses or Group of Courses	**Program Outcomes**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Foundation Courses: Maj/Stat-101, Maj/Stat-102, Maj/Stat-202		√			√		
Applied Statistics: Maj/Stat-101, Maj/Stat-102, Maj/Stat-201, Maj/Stat-202, Maj/Stat-204, Maj/Stat-205, Maj/Stat-302, Maj/Stat-303, Maj/Stat-304, Maj/Stat-308, Maj/Stat-309, Maj/Stat-404,	√	√		√	√	√	
Mathematical Statistics: Maj/Stat-301, Maj/Stat-306, Maj/Stat-307, EC/NM-301, Maj/Stat-401, Maj/Stat-403,	√	√		√	√		
Research Methodology: Maj/Stat-305, Maj/Stat-402		√	√	√	√	√	√

Table 4.5 Standard 2-2 requirement

Elements	**Courses**
Theoretical Background	Maj- Stat 101,102,201,202,203,205,301,303,304,306,307,308, 309,401,403,404
Problem Analysis	Maj-Stat101,102,201,203,204,205,302,303,304,305,306,307, 308,309,401,403,404 EC/NM 301
Solution Design	Maj/Stat-301,302,303,304,305,306,307,308,309, 401,402,403,404

➡ **Degree Title**

MS Statistics

➡ **Definition of Credit Unit**

One semester credit hour represents one class hour (60 minutes) or two laboratory hours per week. An academic semester represents 16 weeks of classes exclusive of final exam.

➡ **Degree plan.**

Tables 2.1 show curriculum breakup of MS degree in terms of major requirements.

Table 2.1: Curriculum course requirements

Year	Courses	Title	Credit Hours	Lab. Hr	Total Credit Hr	Pre Requisites
I	Stat-501	Mathematical Statistics	3	-	3	
	Stat-502	Advanced Sampling Techniques	3	-	3	
	Stat-503	Linear Models and Regression Analysis	3		3	
	Stat-504	Multivariate Analysis-I	3	-	3	
	Stat-505	Statistical Inference	3	-	3	
	Stat-506	R-Language	3	-	3	
	Stat-507	Categorical Data Analysis	3	-	3	
	Stat-508	Survival Data Analysis	3	-	3	
II	Stat-601	Seminar	2	-	2	
	Stat-602	Thesis/Research	10	-	10	

Curriculum Breakup

Curriculum Breakup	**Credit Hours**
Core Courses	
Mathematical Statistics	3
Advanced Sampling Techniques	3
Linear Regression Models and Regression Analysis	3
Multivariate Analysis-I	3
Statistical Inference	3
R-Language	3
Seminar and research Reading/Review	2
Thesis/Research Work	10
Elective Courses	
Categorical Data Analysis	3
Survival Data Analysis	3
Elective Courses	**6**
Total Credit	**36**

Table 2.2: Curriculum course requirements

Semester	Course Number	Category (Credit Hours)	
		Core Courses	**Elective Courses**
I+II	Stat-501 Stat-502 Stat-503 Stat-504 Stat-505 Stat-506 Stat-507 Stat-508	18	6
III+IV	Stat-601 Stat-602	12	
Total		**30**	**6**
Minimum Requirements			

Standard 2-1: The curriculum must be consistent and supports the program's documented objectives.

Table 4.4 Courses Vs. Program Outcomes

Courses or Group of Courses	Program Outcomes			
	1	**2**	**3**	**4**
Core Courses: Stat-501, Stat-502, Stat-503, Stat-504, Stat-505, Stat-506.	√	√	√	√
Elective Courses: Stat-507, Stat-508	√	√	√	

Standard 2-2 Theoretical background, problems analysis and solution design must be stressed within the program's core material

Table 4.5 Standard 2-2 requirement

Elements	Courses
Theoretical Background	Stat-501, Stat-502, Stat-504, Stat-505
Problem Analysis	Stat-503, Stat-504, Stat-506, Stat-507, Stat-508
Solution Design	Stat-502, Stat-503, Stat-506, Stat-507, Stat-508

Standard 2.3: The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body.

The curriculum satisfies both the core requirements of credit hours and criteria of admission laid down by Lahore College for Women University and HEC and is in par with the international standards.

Standard 2.4: The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body.

The curriculum satisfies major requirements of the program. No formal accreditation with any professional body. The programs and curriculum has the approval of Board of Studies BS Statistics.

Standard 2.5: The curriculum must satisfy general education, arts, and professional and other discipline requirements for the program, as specified by the respective accreditation body/council.

The curriculum satisfies general education disciplines requirements. No formal accreditation with any professional body but it fulfills all the necessary/basic requirements of the accreditation body. The programs and curriculum has the approval of Board of Studies of BS Statistics, and Lahore College for Women University.

Standard 2.6: Information technology component of the curriculum must be integrated throughout the program.

- At present information technology components are partially integrated in BS Statistics Program. However the department is planning to integrate it throughout the program near future.

Standard 2.7: Oral and written communication skills of the student must be developed and applied in the program.

- Oral and written communication skills of the student are developed by seminar, question answers, presentations and class participation of the students.

CRITERION 3: LABORATORIES AND COMPUTING FACILITIES

FACILITIES

Laboratory Title: Computer Lab, Department of Statistics.

Location and Area: Department of Statistics.

Objectives:

1- To facilitate the staff, teaching computer based courses.
2- To facilitate the students, studying computer based courses.
3- To facilitate students for their research projects, internship reports and assignments.
4- To facilitate students of MS & Ph.D. in their research.

Adequacy for instructions: Qualified computer personal are available.

Courses taught: SPSS, Minitab, C^{++} and R languages

Software available: Microsoft Office, SPSS, C^{++}, Minitab, Math type, Mathematica , Statistica and E- views R programming, LATEX.

Major equipment: 24 desktop computers and 1 multi Media.

Safety regulation: No specific safety regulation.

Standard 3.1: Manuals/documentation/instructions for experiments must be available and readily accessible to faculty and students.

Computer lab is accessible for students and faculty. Internet connection is available in computer lab. Lab manuals about software are available in library. To teach different computer based courses teachers are available to instruct students.

Standard 3.2: There must be adequate support personnel for instruction and maintaining the laboratories:

In computer lab of Statistics Department only one lab incharge is available; there is no full time lab technician.

Standard 3.3: The university computing infrastructure and facilities must be adequate to support program's objectives:

- Computer lab is equipped with 24 desktop computers and internet connection is available.
- Existing lab facilities are inadequate to fulfill requirement.

CRITERION 4: STUDENT SUPPORT AND ADVISING

Standard 4.1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner:

- Department strategy for course offering is from lower level to higher level e.g. BS and and MS.
- The courses are offered yearly.
- Course outline is provided before the start of each semester which includes the structure of course work to be studied in that semester.
- Electives courses are offered according to the availability of instructor.
- The courses Mass Communication, Economics, Mathematics, Phsychology, Social work & Geography are offered as minors in BS Statistics.

Standard 4.2: Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants:

1. Courses in the major area of study are structured to ensure effective interaction between students and faculty.
2. Teaching assistants are not available.
3. One course is taught by one faculty member however all the faculty members and HOD are always available to solve the student's problem and guide them.
4. The students are encouraged by faculty to ask questions in class rooms and seminars.
5. There is a counseling center in the university where career guidance is provided to the students.
6. The results of students going to counseling center are used to determine its effectiveness.

Standard 4.3: Guidance on how to complete the program must be available to all students and access to academic advising must be available to make course decisions and career choices:

- Students are informed about program requirement by respective faculty.
- Students are provided guidance regarding career opportunities by faculty.
- Renowned Statisticians are regularly invited to deliver lectures regarding the latest developments taking place in field of statistics thus enhancing the knowledge of students. They also guide the students regarding the different fields in which jobs are available.

CRITERION 5: PROCESS CONTROL

Standard 5.1: The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives:

Admission:

BS Statistics [4 Year Degree Program]

This is a 4-year degree program with minimum 131 credit hours. The program is divided in 8 semesters with 2 semesters each year.

Eligibility Criteria

Female students who have passed Intermediate with Statistics and Mathematics / A-level with Statistics as subject are eligible to apply. However, 25% seats are reserved for pre-engineering students.

MS Statistics [2 Year Degree Program]

This is a 2-year degree program with minimum 36 credit hours. The program is divided in 4 semesters with 2 semesters each year.

Eligibility Criteria

Female students who have passed BS/ MSc Statistics with minimum CGPA 2.5 are elligible to apply along. Final selection is based on written test and interview.

Standard 5.2: The process by which students are registered in the program and monitoring of students' progress to ensure timely completion of the program must be documented. This process must be periodically evaluated to ensure that it is meeting its objectives:

- Advertisements are published in leading newspapers and are available on Lahore College for Women University web site.
- Those students who fulfill all the admission requirements are registered in the program.
- Student's academic progress is monitored by test, assignments, quizzes, presentations, mid and final semester examinations.
- Evaluation is done at the end of each semester.

Standard 5.3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that it is meeting its objectives:

- Permanent faculty is hired according to departmental requirement whose recruitment is done by board constructed by university.
- An annual confidential report (ACR) is initiated by HOD annually for each staff member.
- All the faculty members have good assessment quality as well as research and communication skills, so the students get benefit from them and are able to make successful careers.
- Students having low grades are guided by the faculty members so that they can improve and achieve the required GPA.

Standard 5.4: The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives:

- Internship reports and viva of research projects are evaluated by the external examiners.
- The entire faculty follows HEC syllabus manual which is revised yearly.
- Evaluation is done twice in each semester, in mid term and final semester examination.

Standard 5.5: The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

- The program is based on high standards to ensure that outgoing students have completed its requirements.
- The semester rules have been adopted by the department. The Head of the Department ensures their compliance.

CRITERION 6: FACULTY

Standard 6.1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline:

There are 21 total staff members in the department of Statistics out of which there are:

Associate Professors: 02

Assistant Professors: 11

Lecturers: 7

For BS program

Program area of specialization	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with PhD degree
Basic Statistics	5 courses, 7 sections	4	
Applied Statistics	12 courses, 12 sections	8	1
Mathematical Statistics	9 courses, 9 sections	9	3
Total	26 courses, 28 sections	21	4

For MS program

Program area of specialization	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with PhD degree
Applied Statistics	3 courses, 3 sections	10	1
Mathematical Statistics	5 courses, 5 sections	7	3
Total	8 courses, 8 sections	17	4

- No. of faculty members who have done M.Phil are 14.
- Five faculty members are enrolled in PhD program.

Resumes of all staff members are attached in for reference.

Standard 6.2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place:

- Staff development courses are arranged by the university for the recruited faculty members.
- Courses files for every semester are maintained by all the staff members required by QEC.
- Lectures and seminars are arranged by the department on regular basis.
- Guidance and consultation provided by the senior faculty members.

Standard 6.3: All faculty members should be motivated and have job satisfaction to excel in their profession:

profession.

- Participation in professional competency enhancement training program arranged by the institutions.
- Tenure track system.
- Lecturers completing their Ph.D programs are offered post of Assistant Professor on adhoc basis.

CRITERION 7: INSTITUTIONAL FACILITIES

Whenever an institution introduced some program, there are certain objectives specified for these programs. Fulfillment of these objectives depends upon many terms and conditions. One of these conditions is Institutional Facilities.

Institutional Facilities include library, classrooms and offices must be adequate to support the objectives of the program.

There are certain standard of this criterion that must be met.

Standard 7.1: The institution must have the infrastructure to support new trends in learning such as e-learning

Departmental building is partially equipped with the latest technologies.

- Internet facility is available in computer lab.
- Access to HEC digital library.
- One computer lab is not sufficient due to increasing strength of students.
- There is no research room for students and faculty members.

Standard 7.2: The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel:

There is no departmental library; however in Post-Graduate Block library of University, a section for books on Statistics is maintained.

- Books on all courses being offered are available.
- Annually new books are added to the existing lot.
- Library provides book borrowing facility and reading space.
- Library is well equipped with means of e-learning like computers, internet facility and access to HEC digital library for students.

Standard 7.3: Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities:

There are six class rooms, one computer lab, an office for Chairperson of Department and two staff rooms - one in old Statistics department and one in PG block.

- Number of rooms is inadequate due to increasing trend in student strength.
- Staff rooms are not capacious enough to accommodate all staff members.
- There is no committee room for department.

CRITERION8: INSTITUTIONAL SUPPORT

Standard 8.1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars:

- Faculty members are hired based on criterion established by University.
- Faculty members are encouraged to attend seminars, conferences and training courses at University and other institutions as well.
- University provides grants to publish research papers and to attend conferences.
- University funds department partially to maneuver seminars and conferences.
- Lack of training for faculty members to learn international standards of teaching.
- Grants to publish research papers and to attend international conferences are entertained up to Rs. 50,000 only.
- There is no PA for the chairperson of department

Standard 8.2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. students:

Year	No. of Graduate Students	No. of Research Assistants	No. of Ph.D. Students
2016	57	Nil	Nil
2017	60	Nil	Nil
2018	43	Nil	Nil

For the faculty: graduate student ratio please refer to table:4.

Standard 8.3: Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities:

- There are no pre-defined resources for library.
- There are no pre-defined resources for computer lab.